DOCUMENT RESUME

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ABSTRACT

This annotated directory of environmental education curricular materials for elementary school teachers and librarians is written to accompany three previous bibliographies published by the Department of Education (Minnesota): "Audio-Visual Materials for Environmental Education," February, 1971; "Selected Bibliography for Environmental Education," April, 1970; and "Selected Resources for Environmental Education," Winter, 1972. Contents include an alphabetical listing by source according to grades kindergarten through third and fourth through sixth (and up) and are organized according to the following subject headings: Games; Posters, Maps, Charts; Multimedia Kits; Films, Filmstrips; Teacher's Guides, Resource Materials; Pamphlets, Booklets; and Individual Curriculum Units. The last section contains a list of sources and publishers. (LK)

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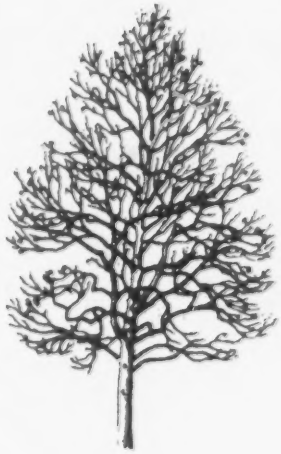
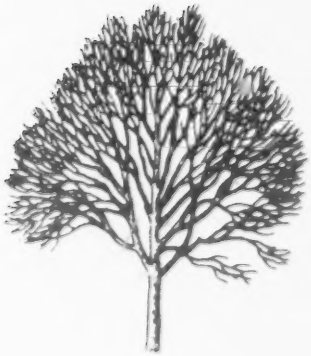
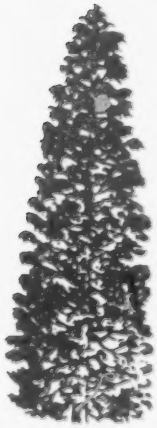
ENVIRONMENTAL EDUCATION CURRICULAR MATERIALS







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ADDENDA

(Materials received too late to be included in the main list.)

Curricular Materials - Grades K-3

TEACHER'S GUIDES

Michigan Department of Natural Resources. Environmental Education for Elementary Grades. Free. K-4.
Teacher's manual contains activities, discussion topics, and attitudes to be developed in three areas: rocks and minerals, soils and water, and plants and animals.

Curricular Materials - Grades 4-6

GAMES

Games Central. Culture Contact. $30.00. Grades 4-8.
A simulation game in which students take the roles of traders and of primitive islanders. Conflict develops over the use of natural resources and their value.

TEACHERS GUIDES

Garden Club of America. The World Around You. $1.00. Grades 4-8.
A packet of environmental education materials for teachers. Includes a study guide with reprinted articles on population, soil conservation, etc., and leaflets about growing gardens, national parks, birds, and so forth.

Michigan Department of Natural Resources. Environmental Education for Intermediate Grades. Free. Grades 5-8.
Teacher's manual contains activities, discussion topics, and attitudes to be developed in three areas: soil conservation and land use; trees, woodlots, and forest; and wildlife and fishes. A variety of supplementary booklets and leaflets are available.

Sources

Garden Club of America, Conservation Committee, 598 Madison Avenue, New York, NY 10022.

Michigan Department of Natural Resources, Lansing, MI 48926.

ENVIRONMENTAL EDUCATION CURRICULAR MATERIALS

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Curricular Materials Grades 4-6 (and up)

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INTRODUCTION

This is a directory of environmental education curricular materials for elementary school teachers and librarians. It is not comprehensive or exhaustive. There exist many other materials which we had neither time nor space to include, but which may be included in a later edition.

The Department of Education does not endorse these materials; we merely invite you to look at some of them and let us know what you think.

Because all of the materials were developed within the last four years, copyright dates are not included. Material that is not copyrighted was identified as such.

Sources and publishers are listed last. Whenever possible, the local representative of the company is listed. Teachers wishing to rent films are advised, however, that local film libraries (such as the one at the University of Minnesota) are not listed, and you might want to check out local sources and rental fees before writing to the original supplier or publisher.

Finally, this bibliography is written to accompany three previous bibliographies published by the Department of Education: "Audio-visual Materials for Environmental Education," February, 1971; "Selected Bibliography for Environmental Education," April, 1970; and "Selected Resources for Environmental Education," Winter, 1972. The first two were distributed to all school libraries in the state; the third can be obtained from the Environmental Education Consultant, Department of Education, Capitol Square Building, St. Paul, Minnesota 55101.

CURRICULAR MATERIALS - GRADES K-3

GAMES

EMI. Clean-up Game. $5.00. K-3.
A board game. Players hop around an easy-to-assemble town viewing all the trash. Then they undertake a clean-up campaign with trash cans, trees and flowers. For 2 to 6 players.

EMI. Littering Game. $5.00. Grades K-3.
A board game teaches children the evil of littering and the importance of picking up trash. The game is completely color-coded with no numbers or cards to read, a plus for slow readers but a handicap for the colorblind. For 2 to 4 players.

POSTERS, MAPS, CHARTS

Carnegie Museum. Ecology Charts. $10.00 plus shipping. All grades.
Set of 12 ecology charts, printed on colored cardboard, 20 x 24 inches, accompanied by mimeographed teaching guides. Fairly simple text and pictures. No. 10, for example, has the following text: Food Chain (headline at top): Green leaves change sunshine into energy, grasshopper eats green leaves full of energy, mouse absorbs energy by eating insects, fox catches many mice for his energy needs. Are you a link in a food chain?

National Audubon Society. Audubon Chart/Posters. $8.00 a set. All grades.
Set of eight decorative chart/posters, each with explanatory text or descriptive booklet. Topics: conservation, ecology, mammals, trees, birds, wildflowers (2 charts), and a mystery poster.

National Wildlife Federation. Wildlife: Who Needs It? Free. All grades.
On back, lists state chairmen for federation; on front, shows color photo of small child staring at robin with open mouthed wonder (robin has its mouth open too).

Population Institute. Population Poster Packet. Free. All grades.
Packet of six small posters, brightly colored, which graphically portray the problem of overpopulation. The most effective is an orange and yellow one showing two people on the front page; it unfolds to illustrate what a geometric progression means. Included is a discussion sheet giving some ideas on how each poster can best be used.

Poster Makers, Inc. Eco-Message Posters. Posters, $2.50; Bumper stickers, 50¢; Packets, $3.00.
Ecology posters in bright colors, vivid designs, simple lettering. Typical is one of four monkeys; three have hands over their eyes, mouth, ears, and the fourth is holding his nose. The posters are generally 22" x 33"; the same designs are available in letter size, 7¼" x 11", or in stiffened paper or sticky-backed paper the same size. You can order packets which contain an assortment of the posters in the smaller size.

Rand McNally. Interactions Study Prints. $36.00 each set. K-3.
Sets of 20 pictures printed on 18" x 22" sturdy backing, varnished, and corner-punched for hanging. About half are colored and half black and white. Interaction of Man and His Environment draws chiefly upon the field of geography. Interaction of Man and His Resources draws upon the field of economics. On the reverse side are instructional guidelines; included is a teacher's manual.

U.S. Geological Survey. Minnesota Maps. 50¢ or $1.00 each. All grades.
A wide variety of maps are available, including maps of specific areas within the state, a topographic map, a shaded relief map, a geodetic control map, a Platte River map, a Twin Cities area map, and a Duluth-Superior map. There are also sets of topographic maps showing certain physiographic features. Specify the series (7½ min., 15 min., or 1:250,000).

MULTIMEDIA KITS

EMI. Ecokits. $3.00 each, quantity discounts; series, $36.00 a dozen. Grades 1-3.
Equipment and instructions for experiments to be done in small groups. Each kit includes vials, filter paper, droppers, chemicals, a plastic box in which the kit comes, and an instruction booklet. Subjects are: Why Leaves are Green, Does Life Recycle, Is the Water Clean, and Do Fish Breathe.

Educational Progress Corporation. Awareness of the World Around You. $172.00 tape, $192.00 cassettes. Preschool-Grade one.
A multi-disciplinary program designed to develop an awareness of health, safety, social behavior, community study, nature study and ecology. The program focuses on the child and his influence on the environment. One lesson, for example, is entitled "Buckles the Cat," and is about the correct way to handle and play with pets. The program is organized into two sets, each with 20 units. Each unit has a tape and a study print with a lesson guide on the back of each print; there are program guides for teachers too.

Pennsylvania Department of Environmental Resources. The Birth of a Tree. Approximately $2.00. Grade 3.
The Pennsylvania Bureau of Forestry has provided each third grade classroom with a tree kit. Each kit contains 36 synthetic soil blocks, plus Norway spruce seeds, a wall chart, and an informative teacher's guide. The trees are planted in the classroom and, as they grow, students discuss the structure of the seed, germination, the function of soil, etc.

Scholastic Book Services, Inc. Earth Corps Study Program. $24.00 per unit, $17.85 for film.
Two kinds of units: Environmental Units for Social Studies Emphasis and Ecology/Conservation Units with science emphasis. Within the Environmental Unit are two grade levels, "Look Around You" for Grades 1-3, with activities primarily involving perception; and "First Follow Nature" for grades 4-6, in which children explore why some environments are pleasant and some aren't and what man has done

to them. Included are 12 transparencies about environments, a double size poster, 20 black and white photos, a record of Pete Seeger, 24 individual song sheets, a teacher's manual, and student activity workbooks.
The Ecology/Conservation Unit is similarly divided. "We Need Each Other," for grades 1-2, teaches the principle of interdependence "Earth is My Home," for grades 3-4, introduces children to how soil is made, how rain is made, the vital food chains, and bacteria. "Sharing the Earth," for grades 5-6, presents the water cycle, energy and nutrient cycles, life zones, weather, etc. Included in this are 9 transparencies, a giant earth cycles wall chart, 24 student activity books, and a teacher's manual. Along with the sets can come a sound filmstrip called "Earth--Oasis in Space." There are also some certificates and buttons making the students full-fledged members of the Earth Corps.

Urban Systems, Inc. Little Greenhouse Growkits. $36.00 per dozen, quantity discounts. All grades.
Kits to grow plants in the classroom. There is a kit with an assortment of six flowers, one with an assortment of six vegetables, and one with an assortment of six herbs; each assortment comes with display items. Or you can get a kit with all one sort of flower, vegetable, or herb.

FILMS, FILMSTRIPS

Educational Dimensions Corporation. Perception: Birds; Perception: The City; Perception: The Seasons. $30.00 record, $34.00 cassette. All elementary grades.
Sound filmstrips with lesson plans designed to increase the student's perception to the beauty of the world around him. Emphasis is on appreciation of beauty rather than upon classification and labeling.

Madison Public Schools. Looking Closely. Grades K-3.
Slides, narration, bulletin board materials, activity sheets, prints, and maps. Topic is a beginning ecology study stressing the joy of discovering the outdoors. By looking closely at home, in school, or on a trip to field, wetland, or forest, the child becomes aware of beauty and diversity in the natural world. Suggested that set be used in coordination with an outdoor field trip.

Metro Clean Air Committee. The Runaround. Postage price only. Grades K-Adult.
Cartoon portrayal of "Mr. Average Citizen" who tracks down the sources of air pollution and discovers he is part of it. Entertaining. Color, 17 minutes.

TEACHER'S GUIDES, RESOURCE MATERIALS

Agricultural Extension Service. Guide to Environmental Education Resources in the Twin City Area. Unpriced. No copyright.
A teachers guide to local resources (organizations, agencies, industries) for ecology and nature study, natural resources and

management, social relationships, solid waste management, reuse, recycling. From the sources in the categories, the following types of assistance are indicated: field studies, facility tours, library service, printed matter, and speakers.

Cooperative Educational Service Agency 12. Environmental Education Concepts and Teaching Activities. No copyright. No price. All grades.
A listing of e.e. concepts with suggested teaching activities for various grade levels. Concept #1, for example, is "The location of resources affects the economy of a region." Teaching activities listing parental occupations and discussing the relationship of local natural resources to the types of work done.

Dow Chemical Company. Environmental Involvement . . . A Teacher's Guide. Copyright 1971. Free.
Lesson ideas and projects at various levels for kids K-12. The lessons include projects on solid wastes, water quality, waste treatment, noise pollution, air quality. There is also a bibliography with publications and films listed by those categories plus one on conservation. Permission granted for schools to reproduce the paper.

J. G. Ferguson Publishing Company. People and Their Environment: Teacher's Curriculum Guide to Conservation Education. Grades 1-3.
Curriculum guide with lessons, lists of materials, and bibliography. Organized around themes of interdependence; heredity and environment; and constant change.

J. G. Ferguson Publishing Company. "People and Their Environment: Teacher's Curriculum Guide to Conservation Education." 1-12 outdoor laboratory.
Uses same conceptual schemes as others to have lessons on water pollution, nutrients for plants, forests and fire, wilderness, biomes, succession, etc. Focus is on outdoor education and camping.

Forest Service. Conservation Activities for Young People. 1969. No price listed.
Outlines of field excursions, experiments, and ideas for exhibits, posters, slogan contests, written themes, picture collections, and panel discussions. Easily adaptable for all elementary grades. Emphasis on soil and water conservation.

Indiana Superintendent of Public Instruction. Act in Time. Free. Grades K-12.
A teacher's guide to using art in conservation instruction. The guide is divided into elementary level and secondary level, with projects in various media suggested for each level. There is also a bibliography and short sections on design, creative expression, and suggestions for titles.

Indiana Superintendent of Public Instruction. Outdoor Education Handbook: Outdoor Education--Some Suggestions Useful in Planning; Let's Learn About Natural Resources. Free. K-12.
Mimeographed booklets for outdoor education activities. Each has a minimum of discussion of behavioral objectives, goals, tech-

niques, importance of the subject, etc., and a maximum of activities and experiments; they are most useful to the experienced teacher who is sure of his goals.

The Interstate. Tips and Tricks in Outdoor Education. Copyright 1970. $3.95. All grades.

A paperbound teacher's guide to outdoor education which includes animal studies, ecological studies, geology and soils, compasses, measurement and mapping, arts and crafts, outdoor recreation, weather, creative expression, and study of community resources. Outdoors and classroom instruction are completely correlated.

Lexington Public School System. Elementary Environment Guide. No copyright. Two volumes. No price.

A two-volume K-6 teacher's guide, now under revision, and scheduled to be reissued this fall (1972). Each volume will have background material for teachers, activity cards for students, and a bibliography. The first volume will cover the surroundings of Lexington; the second will cover shoreline and marine exploration. The school system will send the State Department one copy which can be reproduced for distribution in Minnesota; due to a limited budget, Lexington is not able to distribute many copies.

Maine School District #77. E. E. Teaching Guides. No copyright. No price. 1971. K-6.

Each stapled booklet focuses on developing attitudes towards environments. At the K-1 level, the school environment is emphasized; grades 2-3, the neighborhood; grades 4-5, the community; and grade 6, the region. Within each unit, twelve environmental themes will be examined, six dealing with the natural environment and six with the man-made. Each section involves classroom presentation, field trip, and follow-up activities; each section is part of one of the themes. For grade 1, under the man-made environment, theme #9 is transportation; one activity suggested is finding out how many school buses there are, who maintains them and schedules them. There are separate booklets for each grade. Not specific to Yarmouth, Maine, in most cases.

Maine School District #77. Environmental Education Program, Organization and Operation; The E.E. Committee; and the E.E. Resource Center. No copyright. No price. 1972.

First one describes the structure and function of an e.e. program serving schools in a regional area in Maine. Second booklet describes the organization and function of an e.e. committee which assists the local school in establishing an e.e. program. It suggests specific steps which such a committee should follow. The third booklet suggests considerations for establishing and maintaining an e.e. resource center, including ideas on how to go about it.

Maine School District #77. The School Site in Environmental Education. No copyright. No price listed. 1972.

Discussion and illustration of the ways in which the school site can be an ecological laboratory, an environment management laboratory, a natural history interpretive area, and a multiple-use school and community recreation area. Emphasis is on proper selection of a site and planning before building. Stapled booklet.

Maine School District #77. Yarmouth, Maine, Community Environmental Inventory the Community Environmental Inventory. No copyright. No price. 1972.

The first booklet is a compilation and evaluation of the natural and man-made features of Yarmouth. The booklet is intended to assist the community in planning, and it provides basic information upon which schools can develop outdoor education programs. The second booklet contains a listing of elements in a comprehensive community inventory--an outline of points that should be covered and techniques for detecting possible problem areas.

Minnesota Geological Survey. Guide to Mineral Collecting in Minnesota. Guide to Fossil Collecting in Minnesota. Geologic Sketch of the Tower-Soudan State Park. 50¢ each.

Each of these little booklets is well illustrated with maps and charts and sketches. Each offers some general background on its subject and a detailed guide to the specifics in the state. The pamphlets are too complex for elementary school students, but may be useful to the teacher as resource material when a little kid brings in a strange rock and says "What is this?"

Muscatine-Scott County School System. Mini-Explorations of Our Environment. $2.00. K-6.

Activity guides designed for handicapped children but can be used by any class. Activities classified by air, soil, water, plants, animals, and man. Appendices show how to make simple equipment.

Muscatine-Scott County School System. Observing Our Environment Through Our Senses. $2.00. K-6.

Teacher's guide designed for handicapped children but can be used by any class. Leads class to observe, explore, and experiment in outdoor activities through the five major senses.

National Education Association. Man and His Environment: An Introduction to Using Environmental Study Areas. Copyright 1970. $1.75 each with discount on quantity. All grades.

Booklet applying the strand approach to any site--the strand approach incorporates five broad, universal concepts into a unified whole: variety and similarities; patterns; interaction and interdependence; continuity and change; and evolution and adaptation. Sample learning activities using these themes are offered. There is a bibliography. For $17.00 you can get a companion filmstrip with its script, recorded narration, and one copy of the booklet. Color, sound, 14 minutes, 91 frames.

National Park Service, Pacific Northwest Region. Environmental Education on the Urban School Site. No copyright yet. Free. All grades.

A manual for teachers with school site activities in art, math, social studies, general science, and communications. Also gives "how to" steps for pacing and mapping, building a terrarium, leading children in the outdoors. At present the manual is in experimental form and not available for general distribution, but it may be ready by 1973 or 74.

New York City Board of Education. Adventures on the Beach: Teacher's Guide for K-12. $2.50. Copyright 1972.

Activities for classes at the seashore. In the elementary section, 10 separate activities deal with the sand, the horizon, seashells, salt in the ocean, water, seaweeds, tides, seashore birds, marine animals, and man's impact on the beach.

New York State University. Environmental Education Instructional Activities K-6. No copyright 1970.
Activities dealing with the themes of survival, interdependence, scarcity, recycling, right vs. responsibility, planning, valuing social forces, and optimism.

North Carolina Department of Public Instruction. Teacher's Guide for Environmental Education. 1970. Grades K-12.
Lesson plans and activities are not in this book. Rather, it begins with a section defining environmental education, then moves to four sections (ecosystems, natural resources, pollution, and environmental decision making). In each section some themes and concepts are set forth, plus background information and a bibliography.

North Jersey Conservation Foundation. Education for Survival. Copyrighted. Grades 1-3, $5.00; Grade 4, $3.00; Grade 5, $5.00.
A detailed curriculum guide combining ecology, social studies, and pure science. Typical of the series' treatment of issues is the way water pollution is handled. Second graders will make a comparative study of urban and rural community life. Then they study their community including the water supply, and are led by stages into a study of the water cycle, the needs of plants and animals for water, the economics of supplying water, and water pollution. Outdoor activities are suggested as options. Guides through grade 12 are in preparation.

Poudre School District R-1. Environmental Education Curriculum Guide, Teacher's Manual, and Activity Booklet. $1.50 each. K-12.
The first section of the guide contains environmental themes divided by grade level, with activities and objectives listed; then there is a list of resources and of ideas for teachers in planning outdoor education experiences. The teacher's manual is specific to the Colorado State University Nature Center; it is designed to be used on the center's trail and pertains to Colorado trees, geology, lakes, etc. The activity booklet contains ideas for projects which can be done outdoors and indoors; it, like the guide, can be used in conjunction with any outdoor site.

Richfield Public Schools. Richfield Public Schools Woodlake Nature Center Activity Guide. No copyright. No price indicated.
Activities designed to allow classroom teachers to guide their students through the Woodlake Nature Center without a naturalist. Two activity guides have been prepared for each elementary grade level: Grade 1--Fingerprinting Trees; Spring Thing. . .Grade 5--Leaf Study; Woodlake Pond Study are examples. For the tree exercise, students gather leaves and crayon impressions of the tree bark. Materials and procedures are carefully indicated, including preparation of the children for the trip and post-trip discussions.

Rodale Press. The Organic Classroom. $1.50. Copyright. Grades K-8.
More than 30 interdisciplinary activities and projects to do in var-

ious seasons. Examples: grow a herb garden; make your own breakfast cereal; raise worms; recycle your garbage. Background information for teachers included.

Roseville Area Schools. Process Science Mini-Units. 1972. Cost. K-6.
The paperback guide (regular sized) is divided into categories: biological, mathematical, earth, and physical sciences. The lessons are a collection of ideas freely cribbed from the Golden Valley Environmental Science Center, the State Department, the Science Curriculum Improvement Study, and other sources. Units include: Observing Community Habitats, Raisin Bread, Bio-Weight Count, Fingerprinting Trees. Some of the units were developed by the Roseville teachers.

School Progress Reaches Every District. Total Education in the Total Environment Handbook. 60¢ plus postage. K-12.
A handbook for teachers emphasizing the importance of interdisciplinary thought; gives descriptions of how teachers at all grade levels and in all fields can introduce environmental concepts into their teaching.

Superintendent of Documents. Ecology Price List Catalog. Free. Resource material for teachers.
Brief description and price list for pamphlets, charts, reports, books issued by various government offices on the subjects of ecology--air pollution, mine drainage, noise abatement, oil spills, sanitation, solid waste, wilderness preservation are a few of the topics covered.

U.S. Environmental Protection Agency, District Office. Government, Environment, and YOU.
A pamphlet listing Federal, State, and regional government agencies which have information about the environment. Lists strictly confined to offices in the Twin Cities. Explains function of each office, authority, and assistance available. Useful to teachers who want local authorities as speakers or information on local problems.

U.S. Forest Service. Help for Environmental Programs. No price listed.
A six-page, narrow little pamphlet for teachers. Lists sources of help for environmental programs--local sources, state, and federal; plus books and pamphlets for a $25.00 basic library. The library references are divided into grade level categories.

U.S. Geological Survey, Distribution Branch. Popular Publications of the U.S. Geological Survey. Free. Grades K-12.
A listing of pamphlets, booklets, and newsletters published by the Survey about geology, hydrology, topographic mapping, natural resources, and environmental subjects. Frequently the pamphlet will cover one subject, such as volcanoes, or why the ocean is salty.

U.S. Soil Conservation Service. An Outline for Teaching Conservation in Elementary Schools, Teaching Soil and Water Conservation. No price listed. All elementary grades.
Each guide lists various activities and things to talk about. The first guide is newer; it is classified by grade levels; and it

has a bibliography and a list of local SCS offices from which to obtain other publications. The second guide has pictures rather than just text; but the language seems aimed at junior and senior high school students, although the teacher could easily adapt most of the activities.

Wadena Public Schools. Snow, Snowshoes, and Nature: The White Dimension of Environment. 1972. Grades 2-6.
Guide to winter outdoor project--constructing snowshoes and using them for an environmental field trip at Itasca State Park. The project included activities from three disciplines--art, biology, and recreation. Students learned how to hike on snowshoes, how to navigate themselves, how to make casts of animal tracks in the snow, what the effects of a snowmobile are, etc.

PAMPHLETS, BOOKLETS

Metro Clean Air Committee. Air Pollution Workshop. Grades K-6.
Includes flannel board, 73 block-backed illustrations, teacher's resource book, lesson plan guide, and bibliography. Teaches causes, sources, and effects of air pollution. Available free when picked up in person by an adult; must be returned promptly.

Metro Clean Air Committee. Pins, Bumper Stickers, Prints. All grades.
Bumper Stickers: Clean the Air or Suffocate the Consequences and Join the Metro Clean Air Committee. 5¢ each.
Ecology symbol fabric prints - iron-on, washable, colorfast symbols. 25¢ each.
Ecology flag pin - lapel or dress pin, green and white, with the ecology symbol on a flag. $1.00 each.

NASCO. Nature Study Aids. Grades K-6.
Molded plastic replicas of leaves, plants, animal feet, each sturdy enough to withstand much handling. Colored. Various accessories such as cleaning sprays, plastic, ink pads, etc. Prices range from $25.00 for a tree kit to $35.00 for a conservation unit; field guides are $1.50.

National Wildlife Federation. Ranger Rick's Nature Magazine. Grades 2-6.
Reprints especially nice: Air pollution; Water, What Would You Do Without It?; The Mess We're In; Pesticides are Perilous; Recycling. Single copies free; reprints 2-29 copies 15¢ each, 30-99 copies 12¢ each. Subscription--$6.00 for 10 issues.

Rodale Press, Inc. Color Me Healthy. 35¢ each. Grades K-2.
Coloring book with cartoon characters such as Hortense Honey and Rita Rye Bread who tell about themselves and their nutritional value. Additional text provides information on vitamins, minerals, protein, and proper nutritional concepts.

Rodale Press, Inc. Recycling. $1.50. Copyright. Grades K-8.
Short theoretical explanations around the theme of "nothing ever gets lost" lead to easy classroom experiments. Chapters include: animal and plant residues; water; the mathematics of recycling;

the solid waste mountain; and writing intelligent letters to lawmakers and businessmen.

U.S. Environmental Protection Agency, District Office. The Adventures of Walter Waterdrop. Free. Grades K-3.
Coloring book showing Walter Waterdrop visiting a boy's house, getting dirty, and going through a wastewater treatment plant to become clean. The text is filled with words such as "activated sludge," "Aeration tank," "sedimentation tank," "bacteria," etc., many self-explained in the text, but generally difficult for a first or second-grader to read--though the pictures are too simplistic for an older child.

U.S. Environmental Protection Agency. Pamphlets, leaflets, posters. Free. Copyrighted. All grade levels.
A wide variety of leaflets, pamphlets, and posters on the topic of pollution--air, water, solid waste. The publication list changes frequently, so it is not possible to ask for and receive any specific title. In general, single copies only are available.

U.S. Forest Service. Pamphlets, leaflets, coloring sheets. Single copies free. K-6.
Variety of pamphlets about forest conservation. Also sheets of paper with coloring, connect-the-dot games for little children.

INDIVIDUAL CURRICULUM UNITS

American Geological Institute. Environmental Studies 1 and 2. $10.00 All grades.
Teacher's guide and 50 multidisciplinary action cards for fostering environmental awareness in students at elementary, secondary and college levels.

McGraw Hill Company. Elementary Science Study Units. $3.00. All elementary grades.
These fifty-six units in elementary science each concern a specific activity or organism. Emphasis is on experiments and open-ended discussion; activities usually involve several natural sciences and mathematics; sometimes further activities involving other disciplines are suggested. The units are not molded into a set curriculum. Some of the subjects include: pond water, earthworms, tracks, budding twigs, butterflies, sand, crayfish, microgardening, stream tables, mapping, growing seeds, and small things (the microscopic world). Experiments usually call for items obtainable in an ordinary classroom, or else kits can be bought from the publisher. The kits contain lab equipment and samples. Film loops are also coordinated with the subjects. Most of the booklets cover three or more school years; they are designed so the teacher adapts them to his class needs.

MESFI. Minnesota Environmental Sciences Foundation Units. 50¢ to $1.50. K-9.
Individual curricular units include Salts; Soils--Water Holding Capacity; Plant Puzzles; Stream Analysis; Population Variation; School Site Development; Stream Profiles; Population Sampling; Give Earth a Chance; Water Quality; Field Activities Package; Succession in Micro-Aquaria; Photography for Kids; Interdependencies

in the Environment; Soil--Acidity/Alkalinity; Color and Change; Transect Activities I and II; Minnows and Models; Nature's Art; Brine Shrimp; Contour Mapping; Tree Watching; Habitat Study--Transect Study; Liquids and More Liquids; Where are the Animals?; Outdoor Activities Collection; Micro-Climates; Going Snowing.

Minnesota School Mathematics and Science Center. Watching and Wondering. $2.95 for manual, $16.00 class set printed aids.

A coordinated math-science curriculum with special emphasis on observation, description, and measurement. Students pursue activities designed to introduce the ideas of regularities and laws in natural and abstract systems. This particular unit involves observation of the environment; others are more concerned with "pure" science.

National Wildlife Federation. Minnesota Environmental Science Foundation Units. $1.00 or $1.50. Grades 1-9.

Separate units by MESFI, commercially available from the Wildlife Federation. Topics: Wind; Plants in the Classroom; Differences in Living Things; Fish and Water Temperature; Snow and Ice; Oaks, Acorns, Climate, and Squirrels; Vacant Lot Studies; Shadows; Man's Habitat--The City; Sampling Button Populations; Nature Hunt; The Rise and Fall of a Yeast Community.

Rand McNally & Company. Life Science Units, Science Curriculum Improvement Study. Copyright. Grades 1-6.

Curriculum units for life science. Each unit includes a laboratory, teacher's guide, and materials for a class. In the classroom and outside, students work directly with plants and animals, observing the interactions, experimenting with changes they observe. The program's unifying theme is the ecosystem, and children are led to an understanding of it in steps. The curriculum units are: Organisms, Life Cycles, Populations, Environments, Communities, Ecosystems. The program includes optional activities which involve other disciplines than pure science, but the focus of the SCIS program is pretty well confined to the traditional scientific realm. Prices for the complete kits run $160.00 to $212.00; the later units are more expensive and include student manuals and more elaborate lab units.

Robbinsdale Schools. Man and His Environment -- Fourth Grade Social Studies. $1.50 student's copy; $2.50 teacher's copy. No copyright.

Children examine the life patterns and land use in their area. They study the manner in which the Indian and early white man used the land. Then they examine the American way of life in terms of cultural values and ideas. As the culmination of the unit, the children design a future environment changing or maintaining or destroying today's way of life. Students undertake such activities as a scavenger hunt, an appliance survey, and a study of a freeway. Some of the field trips are specific to Robbinsdale.

GAMES

Board of Cooperative Educational Services. The Sumerian Game. No price given. Grades 6-12.
A computer-assisted game designed to be used by handicapped children. Equipment needed: typewriter-terminal, slide projector and tape recorder attached to the terminal, and a copy of the computer program. In the game, the student assumes the role of a priest-king in a Sumerian city-state in the year 3500 B.C. He manages the country for 30 seasons during the course of the game.

EMI. Dirty Water. $10.00. Grades 3-9.
A water pollution game. Students take various roles of industry, nuclear power plant proponents, sewage disposal plant operators, and citizens in a fight for clean water and profits too.

EMI. Ecology. $10.00. Grades 4-adult.
Students try to build a better world by mediating the conflicts between man's technological inventiveness and his environment.

EMI. Population. $10.00. Grades 6-adult.
A game that lets students learn the consequences of over-population in a rapidly developing country.

Games Central. Neighborhood. $16.00. Grades 4-10.
Demonstrates to 12 players in 4 unidentified ethnic groups the development of an inner-city neighborhood over a period of about 200 years. The tabletop gameboard presents the topography of the area which the players then develop with streets, houses, industry, etc. Game is designed for different levels of difficulty; instructions in the teacher's manual.

Games Central. Pollution Game. $24.00. Grades 4-8.
Game, currently under development (should be ready by fall 1972), designed to present community consequences of pollution and of abatement programs. 12-16 players are residents and businessmen in a town meeting, selecting from various pollution control measures and trying to determine who shall pay the cost; when solutions are agreed upon, the short-term and long-term consequences are revealed.

Harwell Associates, Inc. New Town. Kit 1 (10 students) $16.00; Kit 2 (20 students) $28.00. Grades 5-adult.
A game of town planning. Constructed with five levels of difficulty for players of varying ages and backgrounds. The players' goal is to build a new community 25 miles from a major city. Only the location of schools and parks is set; players must decide what else to build. Since the winner is the one with the largest fortune, the choices pit environmental considerations against greed.

Houghton Mifflin Company. The Planet Management Game. $12.00. Grades 5-9.

Players become managers of the imaginary planet of Clarion. They have a budget and can choose among various projects to develop the planet. They have a deck of perforated cards which produce data that enables students to observe the results of their decisions. Inevitably the planet tends to become over populated and polluted. For 5 players. Designed to be used with the textbook, "Man and the Environment."

Houghton Mifflin Company. Pollution. $9.00. Grades 5-9.

Designed for junior high age, but no more complicated than Monopoly, which it resembles in the owning of property, charging rents, accumulating money, taking chance cards. Teams of players try to earn the most while keeping pollution below a lethal limit; some have an interest in minimizing air and water pollution, and others earn more by polluting. Game takes two or three class periods of 45 minutes. Five students. Designed to be used with Houghton-Mifflin's textbook, "Man and the Environment."

Houghton-Mifflin Company. The Redwood Controversy. $7.50. Grades 5-9.

Class conducts a Senate hearing to decide whether to establish a Redwood National Park. Players take the roles of senators and witnesses, with each witness having a different point of view on the part proposals. The game is complicated by the senators running for reelection. Takes several class periods. For up to 30 students. Designed to be used with the textbook by Houghton-Mifflin, "Man and the Environment."

Interact. Dig. $10.00 per kit. Grades 5-12.

Divided into two competing teams, students must construct a hypothetical culture, design artifacts from it, and bury them. The opposing team then excavates the artifacts and deduces the nature of the civilization which produced them. In final discussion students use what they have learned about patterns of culture to analyze the American civilization. Total time is about 23 hours spread over five weeks.

An elementary school teacher might have to modify some of the activities slightly since the game was designed for use in secondary schools.

Interact. Discovery. $10.00. Grades 4-6.

Students divided into groups which represent future colonies face conditions simulating the voyage and the settlement of colonial America. Students decide why they are colonizing, where they should locate their colony and how large it should be, what materials they must bring, and how they will support themselves. The game takes about one hour a day for 4½ weeks for a total of 23 hours.

Interact. Ecopolis. $10.00. Grades 4-6.

Ecopolis begins with the ecosystem in America 150 years ago. Students are divided into groups of insects, animals, Indians, and pioneers struggling to survive. Prior to moving into Ecopolis, a large city and suburbs built upon the ecosystem they have just experienced, students are surveyed on what they have learned so

far. As citizens of the contemporary city, students must solve several ecological crisis concerned with land use and with a growing population. Students get bonus points for extra classroom projects and for outside projects such as collecting cans and trash and cleaning up yards. Total time involved is about 20 hours.

Interact. Equality. $10.00. Grades 4-8.
Equality opens with a brief study of a mythical society, Fantasia, and its slaves, the Uglies. Next students are "born" as citizens in Independence, a mythical American city, and divided into various ethnic, age, education, and income groups. They move into their own neighborhoods and simulate an urban environment. The students study the history of Black Americans, then role-play incidents involving tension between ethnic groups, culminating in a fight over school integration. Total time involved is about 20 hours.

Minnesota State Department of Education. Shokland. (a simulation game). Free. No copyright. Grades 4-6.
Designed to show children that man's development is determined in part by his environment. Students are taught the principles of geography by playing various roles in an imaginary country of Shokland. Small groups take the part of shippers, or farmers, or civic leaders, and discuss the best location for ports or the best use of water.

North Dakota Studies. Dilemma $15.00. Grades 6-12.
A simulation game. Students play the roles of citizens of Middleburg, a small community with a declining economy which is offered a new fertilizer plant by a chemical company. Class activities promote investigation of factors creating pollution together with suggested solutions. A kit includes 32 student handbooks, a teacher's guide, a map of Middleburg, 32 role cards, 1 ecosurvey, 1 community profile chart, and 1 comprehensive exam.

POSTERS, MAPS, CHARTS

Argus Communications. Ecology Posters. $1.00; quantity discounts. Grades 4-6.
13 posters colorful and mod with abstract or photo illustration; some with quotations others not. Example: "I am a friend of the earth" is done in multicolor lettering on a flower-bordered background. "We have met the enemy and he is us!" shows a picture of a industrial plant smoking away.

The Instructor Publications, Inc. Ecology Posters and Eco-Problems, Inc. Each set, $3.50. Grades 4-6.
Ecology Posters: 12 large (12½" x 16") display posters illustrating ecological cycles--food chains, the nitrogen cycle, habitats, etc. Background material in eight-page teacher's guide. Eco-Problems Posters: 12 giant (16" x 25") posters each with a specific ecological problem, factors contributing to it, and questions for the class: urban sprawl, noise pollution, etc. 12-page teacher's guide.

Richlen Distributors. Technology vs. Environment Poster Set. $12.00 a set. Discount on larger orders. Grades 4-6.

Series of large (22" x 28") full-color posters with explanations and statistics. The set so far numbers 7; (more will be added later). Posters are entitled: Automobile; Nuclear Power Plant; Jet & SST Aircraft; Water Pollution & Solid Waste; Pesticides, Biocides; Energy Pollution; Atomic, Chemical & Biological Weapons. Developed by the Environmental Action Group of Canoga Park, California.

Silver Burdett Company. NEED Picture Packet and Teacher Guide. Grades 4-12.

12 full color environmental photos on both sides of 18½" x 23" boards, with accompanying teacher's guide giving instructions for using the five strand approach with the photos. Developed by the National Environmental Education Development program of the National Park Service.

J. Weston Walch. Conservation Poster Sets. $3.50 per set. Grades 4-6. Set of 18 posters, 11" x 14", each with commentary. There are sets on water pollution, ecology of the city, air, visual, and noise pollution.

MULTIMEDIA KITS

Benefic Press. Ecolab--An Urban and Rural Ecology Program. $33.00 Grades 3-6.

A curriculum composed of activity cards, 92 for urban ecology, and 116 for rural ecology. One of the urban ones is about school neighborhoods; it tells the children to make a map of their school neighborhood, mark on it their classmates' homes, mark the route that each takes to school, and examine the street pattern. A rural card about finding directions on a sunny day involves placing popsicle sticks in the ground to mark the progression of a shadow. Well illustrated.

The Creative Teacher, Inc. No Time to Waste. Kit, $7.50; Workbook, 35¢. Grades 3 on up.

Components of this multimedia kit include a student handbook with the comic strip characters, Eco-kid and Punk Polluter in the town of Never Clean; a color and sound filmstrip of the cycle of life on earth; a record with environment songs; a rummy-type card game about the life cycle and pollution; and a teacher's manual. The program is activity oriented. Students survey their community for pollution problems, collect articles on pollution, record the solid waste in each family, write letters to government, and develop a plan for cleaning up a serious litter problem. By Continental Can Company. A program for K-2 is under development and will be completed in fall, 1972.

Denoyer-Geppert. Environment Programs. $35.00 Grades 4-9.

Multimedia kits call "Air for Tomorrow," "Water for Tomorrow," "Land for Tomorrow." Each includes color transparencies, several full-color filmstrips, a record for the filmstrips, a teacher's guide, and a student book. Emphasis is on the proper use of the resource

and man's decisions which deplete his resources; how will the future population survive.

EMI. Ecology Kits. $8.00, quantity discounts. Grades 4-8.
Eight ecology kits with equipment and instructions. Subjects: Why are Leaves Green?; Life in the Water; Predator Prey; What Moves Life; Life from Death; Can I Drink the Water?; Can I Breathe the Air?; and How Fish Breathe.

Educational Progress Corporation. ECOLOGY: Water Pollution Laboratory. $225.00. Grades 4-8.
An exploration into the nature and uses of water and the causes and effects of major types of pollution. Topics covered include "The Water Cycle," "The Demand for Water," and "Water Treatment." The program is structured into 8 major investigations, each with one or more experiments. The laboratory comes equipped with investigation folders, materials for two classes, lab equipment, three filmstrips, and three cassettes, and a teacher's guide.

Science Research Associates. Earth's Atmosphere Laboratory (Learnings in Science). $47.00. Grades 4-6.
Students begin by performing experiments or reading material containing major concepts. Then the student is tested and he reports in class. Each Lab contains material at five reading levels (3.5 to 7.5) so students can read at their own level. Materials include a Teacher's Handbook, Instructional Aid Booklet, Picture Chart, Content Guide Chart, and Student Record Book. The atmosphere lab includes the following topics: air takes up space, air has weight, air is made up of different gases, air changes with altitude, and air is a fluid.

Science Research Associates. Ecology (Biogeography) Laboratory (Learnings in Science). $47.00. Grades 4-6.
Same materials as other SRA labs. Topic is ecology.

Simon and Schuster, Inc. Earth Island: An Introduction to Ecology in Action. $75.00. Grades 4-6.
A multimedia set about key ecological concepts and the relationship of plants, animals, and man; how man has altered the ecosystem over the years. Through activities the student learns of pollution problems in his own neighborhood, and how much he and his family contribute to the total pollution situation and what can be done about it. The set includes a teacher's manual, specimen copy of the student workbook, 22 data cards with illustrated readings on important ecological topics, four large posters, three full color filmstrips with soundtracks on two LP records. Time involved is about six weeks of classroom activity or 11 leassons, a total of 30 class periods.

FILMS, FILMSTRIPS

Argus Communications. Pollution and Ecology. $17.50 each. Grades 4-junior high.
Pollution filmstrip includes a guide with questions, statistics, resources, and daily pollution chart, with a pulsed record for

automatic projectors. Ecology fimstrip includes discussion guide and coordination manual. Both in color.

Avid Corporation. The Balance of Nature/Pollution. $18.00. Grades 5-9.
Two filmstrips and a record present basic ecological concepts and the effects of pollution on ecological relationships. Encourages children to form values and perceive problems. Same corporation has an ecology series, "Open Your Eyes Series," of 10 units--two units for $23.00--for middle grades. Covers plants, insects, mammals, animals, wildflowers, trees, and ecology of wetlands and forests.

EMC Corporation. Our Environment Multi-Media Packages. Unit 1, $66.00; Unit 2, $20.00; Unit 3, $32.00; Unit 4, $69.00; and Unit 5, $62.00. Grades 4-6.
Series of multi-media packages, each with filmstrips, records, transparencies, wall charts, and teacher's guide; the more expensive kits have student workbooks and spirit masters for worksheets. Units cover fresh water communities, sound and noise, aesthetics, the atmosphere, and salt water communities. Emphasis is on the effect of man on the environment.

Education TV for SE Ohio, Inc. ADVENTURE: ENVIRONMENT. Grades 4-6.
This series of 15 television programs will be available nationwide in 1973-74. Programs will cover such topics as urbanization, renewable resources, water utilization, the role of the sun, population, the economics of pollution, and so forth. No price is available yet.

Eye Gate House. Ecological Imbalance: Six Systems Disturbed an Introduction to Ecology: Six Basic Systems Urban Ecology: Six Microsystems. $35.00 a set. Grades 4-9.
Sets of six color filmstrips with teacher's manual. First set investigates the despoliation of the environment caused by man. Second group investigates six ecosystems. Third group examines six urban environments.

Eye Gate House. Social Problems of Our Environment. $54.00 record, $55.00 cassette. Grades 6-senior high.
Set of six sound, color filmstrips with records or cassettes and teacher's manual. Films are entitled: Wide Open Spaces and Human Sardine Cans; Pollution, Unemployment and Inflation; The Suicidal Society; Poisons, Pills, Preservatives and Pressures; The Public Good and Eminent Domain; There Ought to be a Law!

Guidance Associates. An African Essay. $35.00 record, $39.00 tape. Grades 4-6.
Two filmstrips narrated by Anne Morrow Lindbergh. Takes you on a safari through the wild game preserves of Kenya and Tanzania. Goes on to discuss the balance of nature, how man could lose not only animals but breathing space for all that is wild and free in his spirit. Color. 30-40 minutes.

Guidance Assoicates. Cities, U.S.A. $18.00 record, $20.00 tape. Grades 4-6.

Filmstrip explores the various parts of the urban crisis--overcrowding, increasing crime, pollution, mass transit problems, the flight of the middle class, etc. Discusses current projects to reform the city. Minneapolis is one of the cities featured in the movie; former Mayor Arthur Naftalin is one of the persons interviewed. Color. 13-17 minutes.

Guidance Associates. Environment: Changing Man's Values. $35.00 record; $39.00 tape. Grades 4-6.

Two filmstrips explore in a general way environmental problems and some of their causes; discuss roles of individuals, government, and industry. Activities are not suggested. Dr. Barry Commoner, is one of the persons interviewed. 30-40 minutes. Color.

Guidance Associates. Man's Natural Environment: Crisis through Abuse. $35.00 record, $39.00 tape. Grades 4-6.

Two filmstrips examine crises--the death of Lake Erie, the 1969 Santa Barbara oil leak, the Florida jetport proposed for the Everglades--and then review laws designed to protect the environment and some of environmental organizations. Wisconsin Senator Gaylord Nelson is one of the persons interviewed. Color. 30-40 minutes.

Guidance Associates. The People Problem. $35.00 record, $39.00 tape. Grades 4-6.

Two filmstrips discuss the world population explosion and outline its consequences--how it will diminish the quality of life. Goes on to describe measures to control the population explosion. Interviews Dr. Alan F. Guttmacher, President of Planned Parenthood, among others. Color. 30-40 minutes.

Guidance Associates. Transportation: Where Do We Go From Here? $18.00 record, $20.00 cassette. Grades 4-6.

Relates the history of American transportation systems to national growth. Discusses the cost of auto travel, the neglect of mass transit and the railroads, the hazards hampering air travel. Shows some innovations and projects to improve our transportation system. Color. 13-17 minutes.

Guidance Associates. The Wisdom of Wildness. $18.00 record, $20.00 tape. Grades 4-6.

Charles A. Lindbergh describes changes this century has brought to America and discusses the competing needs of technology and wilderness. Goes on to show the jungles in Indonesia, the Florida Everglades, and Tanzania's Serengeti plain. Color. 13-17 minutes.

Hoffman Information Systems. The Ecologians--the Hoffman Ecology Program. $145.00. Grades 5-9.

Students are taken on an audiovisual tour of the environment, guided by a visitor from outer space who has survived the ecological disasters that destroyed his home planet. The program is divided into ten episodes, each concerning one environmental problem of the past or present or future. Each episode comes in an album of four film slides and two records; included also are a teacher's guide, a reader with more information, and a student answer book. Additional copies of the student's materials may be ordered.

Imperial Film Company. Environmental Science Curriculum Resource Unit. Cassette $129.50; record $102.00. Grade 4-high school.

Unit of ten sound filmstrips each designed to present the interdependence of the environment. The first four filmstrips deal with ecology of seashores, forests, ponds, and deserts; the next four deal with flowers, trees, reptiles, and birds; the last two depict man in two primitive villages.

Imperial Film Company. The Journal of Henry David Thoreau: The Seasons. Records, $27.00, Cassettes $29.90. Grades 4-12.

Set of four filmstrips with narration; two concern summer and two spring. Narration is selected passages from Thoreau's Journal; it accompanies photographs illustrating the visual and poetic insights which Thoreau recorded.

Imperial Film Company. Man in His Environment, Groups I & II. Group I - records, $22.00; cassettes $25.90; Group II - records, $27.00; cassettes $29.90.. Grades 4-10.

Sets of two filmstrips with narration depicting man in more direct contact with his environment. Group I includes a film of a Quechua village in Peru and a film of a Shipibo village on the upper Amazon. Group II has two films on village life on a Pacific atoll in Micronesia.

Metro Clean Air Committee. What is Smoke? Free. Grades 4-6.

Examines smoke chemically, as a result of industry, as it contributes to air pollution, and as resulting from cigarettes. Shows relation of pollution and cigarette smoking as health hazards. Color. 45 frames, no sound.

Multi-Media Productions, Inc. Topics In Ecology. Grade 6-junior high.

Five lessons, each with a record, filmstrip, and teacher's guide. "What is Ecology" analyzes the role that the science of ecology can play. "What is Pollution" shows there is only a personal subjective definition of pollution. "What is Air Pollution" presents the causes of air pollution. "The Automobile, Beyond Air Pollution" presents problems of the highway and the role of the auto in our lives. "Prosperity Equals Pollution" shows the relationship between GNP and pollution. Each lesson is $9.95 for record, $11.95 for cassette.

National Instructional Television Center. Community of Living Things. Grades 6-junior high.

A television program of 32 twenty minute lessons in introductory life science with an ecological orientation. The course is divided into five modules, any of which can be used as an independent unit: Exploring Our Environment, Exploring Different Environments; Dynamics of Living Things, Interrelationships, and Man and His Environment. The course uses live specimens not available to most classrooms, film field trips to remote regions, close-up and microphotography. There is a teacher's guide. Fees are scaled to school enrollment. Preview programs are available of 16mm film and on Ampex 1 and quadruplex video tape.

National Instructional Television Center. If You Live In a City Where Do You Live? Grades 4-6.

Six 30 minute color programs--five for pupils, one for teachers--and supporting materials (activity cards and a teacher's guide). The curriculum considers five basic concepts: the exterior environment of a city; interior urban space and the use made of it; changes over time in a city; special needs city people have for space and facilities; and resolution of conflicting needs in the best interests of a neighborhood. The series is designed to be a curriculum unit within a five-week social studies course. Fees are scaled according to school enrollment. Preview programs are available on 16mm film.

Society for Visual Education, Inc. America's Urban Crisis. Records, $51.50, cassettes, $57.50. Grades 4-8.
Full color fimstrips, records, and teacher's guides. On-site photography in six major cities surveys the urban problems of air and water pollution, solid waste, transportation, and housing.

Society for Visual Education. Surviving the Ecology Crisis. Records $36.00, cassettes $40.00. Grades 4-8.
Full color filmstrips, records, guide. Titles: The Polluted Planet, Overpopulation, People in Poverty, and the Power Drain. Emphasis is on the social problems caused by misuse of our natural resources.

Society for Visual Education, Inc. Young Scientists Investigate Pollution. Records, $32.50; Cassettes, $36.50. Grades 4-8.
Set of four full color fimstrips with sound and teacher's guide. Based on science fair projects done by students. Topics: Smog and Plant Growth, Air Pollution and Lung Tissue, Measuring Water Pollution, and Fresh Water From the Sea.

TEACHER'S GUIDE, RESOURCE MATERIALS

Edina Public Schools. Environment Study: An Ecology-Based Science Outline. Unpriced. No copyright. Grades 4-12.
An easy to follow outline of environmental education. The material is divided into two levels, grades 4-6 and 7-12. A comprehensive outline of major concepts is laid out. For each concept, and its subsidiaries, there are classroom learning activities and outdoor learning activities. For example, for Grades 4-6, one of the major concepts is All Life Is Dependent on Environment. One of the subsidiary points to be taught is "Green plants depend upon animals and decomposers to recycle the raw materials for growth." One classroom activity is "Experiment with the use of organic fertilizers on potted plants." An outdoor learning activity for this same concept is "Study a rotting log to observe decomposers at work. Record the types of animals that select this area for shelter."

Educational Media Research. Western Cultural Tradition and Human Survival: The Role of Value Orientations in the Environmental Crisis. $3.25. Grades 6-12.
Student examines the environmental problem by first examining the values of our culture, then his own values, which may be contributing factors to the environmental crisis. The authors suggest spending 4 to 6 weeks with this unit. The language and reading list are aimed at high school students, but enough material of a simpler level is included to make it usedful (with adaptation) to an elementary level.

J. G. Ferguson Publishing Company. People and Their Environment. Grades 4, 5, and 6.

Lessons include: The Water Cycle, Birds and Man Help Each Other, Human Resources--waste prevention, socialism and the honey bee, Heredity--hybrids.

The Instructor Publications, Inc. Outdoor Activities for Environmental Studies. $1.35 each. Grades 4-6.

An activity guide which includes measuring distances, the sun dial, measuring ground cover, wind speed and direction, moving water, soil compacting and absorption rate, and others. 48 page pamphlet.

Unified School District. The Sea: An Interdisciplinary Approach to Marine Science for Elementary School Children. No price listed. Grades 4-6.

Lessons include the physical and biological characteristics of the sea; currents, waves, tides; the beach--a river of sand; and several others (9 in all). Lesson materials include items which often can be found in Minnesota; some of the lessons require field trips to the sea; several do not; and some can be adapted with very little effort to fresh water lakes.

New York State University. An Environmental Experience. No price listed. No copyright. Grades 4-6.

A list of 14 experiences and activities of varying sophistication. Experience #7, for example, involves tape recording a large variety of sounds, categorizing them, and discussing the subject of noise pollution. Another project is organizing an improvement campaign to beautify the school grounds or community parks.

Robbinsdale Area Schools. Summer School Guide for Education for an Improved Environment. No copyright. No price listed. 1971. Grades 4-12.

Spiral bound teacher's books (guide and its appendix) for outdoor education activities. Includes activities for junior high and high school and elementary grades too, many adapted from the MESFI. Emphasis is on students constructing own tools and doing own activities. For example, making a series of traps along a drift fence, constructing a rain gauge, analyzing soil. Heavy on the activities, light on the educational theories and terminology.

Rodale Press, Inc. Teaching Science with Garbage. $1.50. Grades 3-9.

A guide for teachers. Emphasis is on composting or microbial decomposition under controlled conditions. Students perform experiments to demonstrate the changes that garbage undergoes. Topics covered include fungus, biodegradability, what happens to metals, garbage and history, and recycling solid waste.

Silver Burdett Company. Adventure in Environment. No price listed. Grade 6.

A Teacher's Guide, Classroom Book, and Outdoor Book using the 5-strand approach: variety and similarity, patterns, interrelation and interdependence, continuity and change, and adaptation and evolution. Lessons cover six subject areas: art, music, math, social studies, science, and language arts. Children find, through the strands, that environment encompasses any subject area.

Books and guides for grades 3-5 should be ready by November 1. K-2, 7, and 8, are under development. Written by the National Environmental Education Development and the National Park Service.

Superintendent of Documents. All Around You. $1.50 each with quantity discount. Grades 4-8.
An environmental study guide prepared under the aegis of the Bureau of Land Management. Contains units for varying grade levels in urban and rural outdoor settings. For younger grades, introduces environmental awareness through observation and perception; for older students, relates environmental studies to civic studies.

PAMPHLETS, BOOKLETS

American Freedom from Hunger Foundation. Issue Packets: Hunger and Development (and) Population and Development. $2.00 each. Copyright 1972. Grades 6-12.
Each packet contains about 15 carefully selected article reprints, pamphlets, charts, study guide, bibliography, and film list to help a class begin a study of hunger or population. Emphasis is on other nations as well as America.

American Petroleum Institute. Conservation--A Picture Discussion Kit. Free. Grades 5-9.
Seven large, full-color pictures, each emphasizing a particular aspect of conservation, with discussion questions and suggestions for activities printed on each. The Institute recommends using the kit at grades 7-9, but almost all of the questions and activities could be done easily by younger children, grade 5. The Institute has other materials , too, aimed at junior and senior high students.

Channing L. Bete Company. Needed: Clean Air. 25¢ each, with discounts for quanitity. Grades 3-6.
Line drawings and hand lettered pamphlet about air--what it is composed of, how much we used, pollutants of it, the costs of dirty air, health problems, and suggestions for individual action.

Boy Scouts of America. Boy Scout Materials. Grades 3-6.
A variety of Merit Badge Pamphlets at 45¢ each: Bird Study, Environmental Science, Fishing, Forestry, Geology, Insect Life, Mammals, Nature, Oceanography, Reptile Study, Soil and Water Conservation, Weather, and Fish and Wildlife Management.
Also other pamphlets: Ecology Workshop Instructors Guide, Ecology Workshop student's book, Conservation Chart, Ecology Signs, Conservation Teaching Charts, Nature Trail Signs, Guide to Nature Projects, and the Boy Scout Handbook (various prices, none over $5.50, most about $4.00.)

EMI. The Great Ecology Jigsaw Puzzle. $3.50. Grades 4-adult.
The ancient symbols of earth, air, fire and water are stylized into a modern symbol of life. 500 pieces in bright colors.

Environmental Action. Do It Yourself Ecology. 25¢ each. Grades 6-adult.
A pamphlet designed for consumers. It acknowledges frankly that it is impossible to live an ecologically sound life in America; then it

goes on to give things that an individual or a group can do to start living in a way to conserve our natural resources. Some of the suggestions (i.e. put a brick in your toilet) can be done by children; others involve shopping or application of pesticides or other typically adult chores.

Environmental Action Coalition. Eco-News. $1.50 per person on orders of 20-39; $2.00 otherwise, and quantity discounts. Grades 4-6.
An environmental newsletter published monthly, 10 months a year. Each typically concerns a single topic; recent issues have been concerned with noise, garbage, biking, population, abandoned cars, and summer fun and the environment. Issues have activities to be done: math problems, art, language exercises, social studies investigations. Eco-News, sample lesson plans, and bibliographies are distributed in teaching packets also. No price listed.

Houghton-Mifflin Company. Field Guides. $1.20 each or $10.50 for the set of 10. Grades 4-6.
Ten pamphlets with photographs and background data, activities, and lists of materials. The field guides cover soil, fossils, rock weathering, layered rocks, plutonic and metamorphic rocks, minerals, beaches, lakes, meteorites, and astronomy.

Izaak Walton League of America. Ecology Leaflets. Free. Grades 4-6.
Series of leaflets containing very general information on individual topics of ecology, fish, solid waste, water pollution, erosion, and other topics. Each contains a short list of suggestions for individual and class action. Available in single copies for a whole class only. The League also has a more substantial pamphlet, Clean Water, for high school use and for adults.

Kellogg Bird Sanctuary. Environmental Teaching Packets. $10.95 each. Grades 4-8.
Three packets, one covering Canada Geese, one on Mammals, and one called Exploring Water. Each includes slides, charts, leaflets, transparencies, book, and a guide to the use of the packet; there are supplementary materials as well listed in the catalog from the bird sanctuary.

Life Education Program. Life Educational Reprints: Air Pollution, Water Pollution, The Environment, Cars and Cities, Fight Over the Wilderness and The Birds: Vanishing Wildlife. No price listed. Grades 3-6.
Reprints on Life sized paper with four color pictures of articles from various issues. Frequently the language is too difficult for the lower grades, but the pictures are excellent and self-explanatory. Good bulletin board material. Sometimes a list of further readings and films is included.

Metro Clean Air Committee. Clearing the Air. $3.00 annually. Grades 4-6.
Monthly newsletter of MCAC. Typical issue is one page legal size paper, printed on both sides in light blue ink. Has information on latest pollution laws, environmental projects and speakers, industrial pollution. Seems to be metro-oriented.

Metro Clean Air Committee. Pamphlets on Air Pollution. Free. No copyright. Grades 4-9.

A wide variety of pamphlets and leaflets including "Air Pollution Primer," "Air Pollution and You," "Air Pollution Explained," "Pollution and Your Health."

Minnesota Pollution Control Agency. Solid Waste Education. No price listed. No copyright. Grades 5-9.

Explanation of the solid waste problem with consideration of sanitary landfills, salvageable solid waste, collection and disposal of solid waste, and evaluation of a landfill. The booklet includes quiz questions, a glossary and bibliography.

National Education Association. Environmental Crisis: What the Individual Can Do. 30 leaflets for $1.50. Grades 4-9.

A checklist and resource guide designed to stimulate action to prevent further damage to the environment. Areas include detergents, mass transit, returnable containers, lead-free gasoline, and others. A companion filmstrip can be had for $15.00 with a guide and script, recorded narration, and one leaflet. Color, sound, 17 minutes, 117 frames.

National Wildlife Federation. National Wildlife Conservation Stamps. Album - 50¢; Conservation Stamps - $1.00. Grades 4-6.

Set of 35 gummed stamps, each showing separate picture of plant or animal. Also there is a Wildlife Stamp Album with 16 pages of descriptions and special text, with room to mount all stamps.

Rodale Press. Making Compost in 14 Days. $1.75. Grades 5-8.

A workbook and a poster on composting. Youngsters make their own compost piles and watch nature decompose organic materials into rich, natural fertilizer.

School Progress Reaches Every District. Pollution Handbook. 50¢ plus postage. Grades 4-8.

A handbook for teachers, pupils, or community groups in understanding the causes of pollution. It suggests ways in which systematic studies of local pollution can be carried out.

Sierra Club. Sierra Club Teachers Packet. $3.00 donation. Grades 6-12.

Packet of teaching aids including a booklet listing books and films, a handbook for ecological action, reprints of Sierra Club Bulletin articles, and selected timely materials. The films, some of which were made especially for the club, usually take a specific problem and discuss it, e.g. the Oscar winning "The Redwoods." Also have list of poster from their beautiful books, $2.50 each.

State of Wisconsin Department of Education. Pollution: Problems and Projects, and Mathematical Exercises. No copyright, date, or price. Grades 6-9.

Exercises classified into math topics designed to encourage research activity. One exercise, for example, involves the calculation of the water saved in a week by an average person who places a brick in his toilet storage tank. Projects are suggested too such as this one:

take a litter count in school hallways and keep a frequency count of the types of litter at various locations.

U. S. Bureau of Sport Fisheries and Wildlife. Conservation Materials. Free. Grades 6-10.

A packet of 22 materials concerning fish and wildlife conservation. The content of the kit may vary slightly depending on what materials are on hand at the time of inquiry. All are pamphlets or booklets or individual sheets, clearly written, illustrated with line drawings or photographs. Emphasis is on the individual bird or animal, rather than on man's relation with the species.

U. S. Environmental Protection Agency. Man and His Endangered World: ABC's of Human Ecology. Free. Grades 3-6.

Small pamphlet with line drawings and facts about human consumption, solid waste, hazards at home and on the job, dirty air, dirty water, and radiation. Ends with list of things classes and individuals can do. Typography appears to be hand-printed.

U.S. Environmental Protection Agency. A Primer on Waste Water Treatment. Single copy free. Suggest grades 4-8.

Booklet explains the methods used now and processes under development for waste water treatment--lagoons, septic tanks, primary and secondary plants, types of pollutants, oxidation, absorption, etc. Nicely illustrated. Technical at times, the booklet does have a glossary.

U.S. Soil Conservation Service. Conservation and the Water Cycle, Grass Makes Its Own Food, What Soils Are, The Soil That Went To Town. No price listed.

The SCS has a whole series of leaflets and pamphlets concerning erosion and good conservation practices. The Soil that Went to Town is the easiest to read of the above group; it seems aimed at 3rd graders, but the rest of the materials seem more suitable for grades 6-9.

U.S. Soil Conservation Service. Sediment, You Can Be a Conservationist. No price listed. Grades 4-8.

Two well illustrated booklets concerning the need for soil and water conservation. Both booklets could be understood by 4th graders. Both seem to place the burden of conservation upon good farming practices and upon flood control measures. Neither give suggestions for activities.

Twin Cities Federal Executive Board. National Wildlife Federation 1971 EQ Index. 25¢ each, quantity discounts. Grades 6-9.

An index to Environmental Quality, with sections on water, air, soil, living space, wildlife, timber, minerals, recycling, and population. Each section has figures and graphs and drawings with comparisons of the situation now and in the last few years and some extrapolations into the future. The Federation concludes that the trend is still down, our environment is getting worse.

INDIVIDUAL CURRICULUM UNITS

Ag Extension Service. OUTDOOR CONSERVATION CLASSES.

Lesson guides designed for a 20 to 25 minute class period outdoors

with 20 to 30 upper elementary students in a class. Copies of lesson guides and charts are available free from the University or through the county extension agents (who borrow them from Clifton Halsey, 16 Soil Science Bldg., University of Minnesota, St. Paul, Minnesota 55101). The units are undergoing revision at present. They include: Building a New Community; Let's Clear the Air; Let's Make Some Soil; Saving Soil in City and Country; Using Water; Life in a Lake; Where the Pheasants Are; Do Deer Live Here?; What's Good for Grouse; and Man and Mallards.

Benziger, Inc. Web of Life Series on Ecology. $1.20 for book, 30¢ teacher's guide. Grades 4-8.

A series of ten 64 page highly illustrated paperback volumes. Includes an introductory volume, six volumes on the natural ecosystems in the United States, and three volumes on man-made habitats. Every volume written at 4th grade reading level.

Conservation and Environmental Studies Center, Inc. Environmental Education Instruction Plans. $1.50 each. Grades 3-6.

Curriculum units for elementary school e.e. Topics include: A Cleaner World; Art and Design in the Environment: Forests; Main Street, U.S.A.; Water, The Waste of Plenty, etc.

For 10¢ each: Here's What You Can Do About Air Pollution; What You Can Do To Improve Your Environment; Ecology--An Overview; Tips for Field Trips, etc.

Also a $100.00 water quality lab and a $5.00 manual.

Also for 50¢, day long field study lesson plans on Watersheds, Pond Life, What's in a Pond?, and Freshwater Wetlands.

Mine Publications, Inc. Examining Your Environment. Grades 3-7.

A series of twelve paperbound books, beautifully designed and illustrated, to be used by the student. Each book takes a topic: Birds, Mini-Climates, Pollution, Running Water, Snow and Ice, Trees, Astronomy, The Dandelion, Ecology, Mapping Small Places, Small Creatures, Your Senses. The topics are developed through activities, most of them group activities, which are done out of doors. Every activity can take place on or near the school grounds or around the students' homes. Most of the apparatus is easily constructed by the students.

National Audubon Society. Audubon Study Programs. $2.50 each; first five available for $10.00. Grades 4-8.

Study programs in kit form, each including a booklet, a guide for adult leaders, and a wall chart. Programs cover ecology, birds, trees, plants, and mammals. A new program, recently published, is titled Urban Ecology. The Society also has flash cards, slides, charts, films, and booklets on these subjects to supplement the study programs.

SOURCES AND PUBLISHERS

Agriculture Extension Service, Institute of Agriculture, University of Minnesota, St. Paul, MN 55108.

American Freedom from Hunger Foundation, 1717 H Street NW, Washington, D.C. 20005.

American Geological Institute, Earth Science Curriculum Project, 2201 M Street NW, Washington, D.C. 20037.

American Petroleum Institute, 1801 K Street NW, Washington, D.C. 20006.

Argus Communications, 3505 N Ashland Avenue, Chicago, IL 60657.

Avid Corporation, 10 Tripps Lane, E. Providence, RI 02914.

Benefic Press, 10300 W Roosevelt Road, Westchester, IL 60153.

Benziger Inc., Ed Ryan, 9417 Columbus Avenue S, Bloomington, MN 55420.

Channing L. Bete Co., Inc., Box 112, Greenfield, MA 01301.

Board of Cooperative Educational Services, 845 Fox Meadow Road, Yorktown Heights, NY 10598.

Boy Scouts of America, North Brunswick, NJ 08902.

Carnegie Museum, 4400 Forbes Avenue, Pittsburgh, PA 15213.

Conservation and Environmental Studies Center, Box 2230 RD 2, Browns Mills, NJ 08018.

Cooperative Educational Service Agency 12, Dr. David Archibald, 545 West Dayton Street, Madison, WI 53703.

The Creative Teacher Inc., 989 Eighth Avenue, New York, NY 10019.

Denoyer-Geppert, 5235 Ravenswood Avenue, Chicago, IL 60640.

Dow Chemical Company, Midland, MI 48640.

EMC Corporation, 180 E 6th Street, St. Paul, MN 55101.

EMI (Educational Manpower Inc.), Box 152, 30A West Davenport, Rhinelander, WI 54501.

Edina Public Schools, 4660 W 77th Street, Edina, MN 55435.

Educational Media Research, P.O. Box 4453, Minneapolis, MN 55421.

Educational Progress Corporation, Allen Olson, 333 W Grand Avenue, Chippewa Falls, WI 5 729.

Educational TV for SE Ohio, Inc., 4½ West State Street, Athens, OH 45701.

Environmental Action, Room 731, 1346 Connecticut Avenue NW, Washington, D.C. 20036.

Environmental Action Coalition, Kristin P. Bergfeld, 235 E 49th Street, New York, NY 10017.

Eye Gate House, 146-01 Archer Avenue, Jamaica, NY 11435.

J. G. Ferguson & Publishing Company, 6 North Michigan Avenue, Chicago, IL 60602.

Games Central, Abt Associates, Inc., 55 Wheeler Street, Cambridge, MA 01922.

Guidance Associates, Pleasantville, NY 10570.

Harwell Associates, Box 95, Convent Station, NJ 07961.

Hoffman Information Systems, Bob Gjendahl, 3613 Robin Lane, Hopkins, MN 55343.

Houghton-Mifflin Co., Richard U. Nelson, P.O. Box 1081, Burnsville, MN 55378.

Imperial Film Co., Bob Gjendahl, 3613 Robin Lane, Hopkins, MN 55343.

Indiana Superintendent of Public Instruction, 227 State House, Indianapolis, IN 46204

Interact, P.O. Box 262, Lakeside, CA 92040.

The Interstate, Printers and Publishers, Danville, IL 61832.

The Instructor Publications, Inc., P.O. Box 6108, Duluth, MN 55806.

Izaak Walton League of America, 1326 Waukegan Road, Glenview, IL 60025.

Kellogg Bird Sanctuary, 12685 C Avenue, Augusta, MI 49012.

Lexington Public School System, Attention: Edward Jacobs, Lexington, MA 02173.

Life Educational Program, Box 834, Radio City Post Office, New York, NY 10019.

MESFI (Minnesota Environmental Sciences Foundation, Inc.), 5400 Glenwood Avenue, Golden Valley, MN 55422.

Madison Public Schools, Room 209, Administration Building, 545 West Dayton Street, Madison, WI 53703.

Maine School District #77, Dean Bennett, Coordinator, Yarmouth, ME 04096.

McGraw Hill Company, Wayne Weisz, 6004 Arthur Lane, Minnneapolis, MN 55436.

Metro Clean Air Committee, 1829 Portland Avenue S, Minneapolis, MN 55404.

Mine Publications Inc., 25 Groveland Terrace, Minneapolis, MN 55403.

Minnesota Department of Education, Division of Instructional Services, Capitol Square Building, St. Paul, MN 55101.

Minnesota Geological Survey, 220 Pillsbury Hall, University of Minnesota, Minneapolis, MN 55455.

Minnesota Pollution Control Agency, 717 Delaware Street, University Campus, Minneapolis, MN 55440.

Minnesota School Mathematics and Science Center, Minnemast, 720 Washington Avenue SE, Minneapolis, MN 55455.

Multi-Media Productions, Inc., P.O. Box 5097, Stanford, CA 94305.

Muscatine-Scott County School System, Handicapped Children's Nature Study Center, 1523 S Fairmount Street, Davenport, IA 52802.

NASCO--Nature Study Aids, Inc., Red Wing, MN 55066.

National Audubon Society, 1130 5th Avenue, New York, NY 10025.

National Education Association, 1201 16th Street NW, Washington, D.C. 20036.

National Instructional Television Center, 910 Elm Grove Road, Elm Grove, WI 53122.

National Park Service, Pacific Northwest Region, 931 4th and Pike Building, Seattle, WA 98101.

National Wildlife Federation, 1412 16th Street NW, Washington, D.C. 20036.

New York City Board of Education, Publications Sales Office, 110 Livingston Street, New York, NY 11201.

New York State University, The State Education Department, Albany, NY 12224.

Newport-Mesa Unified School District, 1601 16th Street, Newport Beach, CA 92660.

North Carolina Department of Public Instruction, Raleigh, NC 27602.

North Dakota Studies Inc., Box 228, Bismarck, ND 58501.

North Jersey Conservation Foundation, 300 Mendham Road, Morristown, NJ 07960.

Pennsylvania Department of Environmental Resources, Bureau of Forestry, P.O. Box 1467, Harrisburg, PA 17120.

Population Institute, 100 Maryland Avenue NE, Washington, D.C. 20002.

The Poster Makers Inc., 7519 Melrose Avenue, Los Angeles, CA 90046.

Poudre School District R1, 2407 LaPorte Avenue, Fort Collins, CO 80521.

Rand McNally Co., Hubert Zervas, 5401 Interlachen Blvd., Edina, MN 55436.

Richfield Public Schools, Richfield, MN 55423.

Richlen Distributors, 6165 Coldwater Canyon #7, North Hollywood, CA 91606.

Robbinsdale Schools, 4148 Winnetka Avenue N, Robbinsdale, MN 55427.

Rodale Press, Inc., Educational Services Division, Emmaus, PA 10049.

Roseville Area Schools, Independent School District #623, Roseville, MN 55113.

Scholastic Book Services, 904 Sylven Avenue, Englewood, NY 07632.

School Progress Reaches Every District, P.O. Box 487, Wilton, CT 06897.

Science Research Associates Inc., 259 East Erie Street, Chicago, IL 60611.

Sierra Club, c/o Rosemary Henes, 1050 Mills Tower, San Francisco, CA 94104.

Silver Burdett Co., Morristown, NJ 07960.

Simon and Shuster, Inc., 1 West 39th Street, New York, NY 10018.

Society for Visual Education, Inc., Randy Larson, 1808 Cressy Avenue, Anoka, MN 55303.

State of Wisconsin Department of Education, Division of Instructional Services, 126 Langdon Street, Madison, WI 53702.

Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

Twin Cities Federal Executive Board, Room 570 Fort Snelling Federal Building, Twin Cities, MN 55111.

United States Bureau of Sport Fisheries & Wildlife, Federal Building, Fort Snelling, Minneapolis, MN 55111.

United States Environmental Protection Agency, District Office, 7401 Lyndale Avenue S, Minneapolis, MN 55423.

United States Forest Service, United States Department of Agriculture, Washington, D.C. 20250.

United States Geological Survey, Federal Center, Denver, CO 80225; or Geological Survey, Distribution Branch, 1200 South Eads Street, Arlington, VA 22202.

United States Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250.

Urban Systems, Inc., 1033 Massachusetts Avenue, Cambridge, MA 02138.

Wadena Public Schools, Wadena, MN 56482.

J. Weston Walch Publishing Co., Box 658, Portland, ME 04104.